Professionally Applied Topical Fluoride

Fluoride has been an integral part of caries-preventive strategies since the success of the water fluoridation trials in the 1950s.[1] Early fluoride studies reported on the ability to reduce caries in children.[2-4] Contrary to early studies, the caries inhibition effects of fluoride are not confined to childhood. In fact, the benefits of fluoride can be seen throughout one's life as long as a person has exposure to fluoride in small concentrations daily. In an age of multiple fluoride exposures, researchers estimate a 20 to 40% reduction in caries over a lifetime.[5] Fluoride's primary mechanism of action is topical by: (1) inhibiting demineralization at the crystal surfaces inside the tooth, (2) enhancing remineralization, and (3) inhibiting bacterial enzymes.[6] The main exposure to fluoride is in toothpastes, but a significant amount of fluoride is found in processed foods and beverages.[7] The use of topical fluoride has increased dramatically over the last twenty years to include dentifrices, mouthrinses, gels, and varnishes.

We know that fluoride is effective at preventing and even reversing early carious lesions.[6] We also know that caries prevalence has decreased in industrialized nations and that people are exposed to fluoride from many sources.[8, 9] With the knowledge that people are exposed to multiple sources of fluoride, practitioners should use a risk-based assessment to determine the need for professionally applied topical fluoride following a prophylaxis. For low risk patients, with multiple fluoride exposures the additive effect of additional fluoride is not realized, thus professionally applied topical fluoride has little or no value for patients with daily fluoride exposure and little or no caries experience.[10]

Clinicians should not assume that fluoride treatment is appropriate for each patient following a prophylaxis. Clinicians should take into account the caries risk status and total fluoride exposures to determine the need for a topically applied fluoride treatment for each patient. Similarly, those deemed to be at high risk for caries should be recalled for numerous topical fluoride applications throughout the year. In addition, as of January 2001, there are no clinical trials in the literature to support the anti-cariogenic effect of an annual or semi-annual 1-minute topical fluoride treatment. Daily or weekly rinses for 1 minute can be efficacious. The annual or semiannual 1 minute professional topical fluoride technique with gel or foam is without evidence.[11] For those at high risk for caries and will potentially benefit from a topical fluoride treatment, a gel or foam 4-minute application should be utilized. With such a risk-based approach, we can give our patients individualized and appropriate dental care.

	CARIES RISK CATEGORY		
FLUORIDE EXPOSURES	**LOW**	**MODERATE**	**HIGH**

No fluoride exposure	Apply topical 1-2 x per year	Apply topical 2 x per year	Apply topical 3 – 4 x per year
Fluoridated toothpaste	0	Apply topical 1 x per year	Apply topical 2 x per year
Fluoridated water	0	Apply topical 1 x per year	Apply topical 2 x per year
Fluoridated water and toothpaste	0	0	Apply topical 2 x per year
Fluoride rinse	0	Apply topical 1 x per year	Apply topical 2 x per year

Caries Risk Status Categories [12]

LOW Caries Risk –No carious lesions in the last 3 years, good oral hygiene and regular dental visits

MODERATE Caries Risk – One carious lesion in the last 3 years, exposed roots, deep pits, and current orthodontic treatment

HIGH Caries Risk – Greater than Two carious lesions in the last 3 years, past root or smooth surface caries, inadequate salivary flow, inappropriate bottle or nursing patterns

REFERENCES:

[1]Murray JJ, Rugg-Gunn AJ, Jenkins GN. Fluoride toothpastes and dental caries. In: Fluorides in caries prevention, Oxford: Butterworth-Heinemann Ltd, 1991: 127-60.

[2]Arnold FA, Likins RC, Russell AL, Scott DB. Fifteenth year of the Grand Rapids fluoridation study. J Am Dent Assoc 1962;65:780-5.

[3]Ast DB, Fitzgerald B. Effectiveness of water fluoridation. J Am Dent Assoc 1962;65:581-5.

[4]Blayner JR, Hill IN. Fluorine and dental caries. J Am Dent Assoc 1967;74(Special Issue):233-302.

[5]Newbrun E. Effectiveness of water fluoridation. J Public Health Dent 1989;49(Special Issue):279-89.

[6]Featherstone JDB. Prevention and reversal of dental caries: role of low level fluoride. Community Dent Oral Epid 1999: 27;31-40.

[7]Burt BB, Eklund SA. Dentistry, dental practice, and the community. Philadelphia: WB Saunders Co, 1999:279-315.

[8]US Public Health Service, National Center for Health Statistics. Decayed, missing, and filled teeth among children; United States. DHEW Pub No (HSM) 72-1003, Series 11 No 106. Washington DC: Government Printing Office.

[9]US Public Health Service, National Institute of Dental Research. Oral health of United States children. NIH Pub No 89-2247. Washington DC: Government Printing Office, 1989.

[10]Eklund SA, Pittman JL, Heller KE. Professionally applied topical fluoride and restorative care in insured children. J Public Health Dent 2000;60(1):33-8

[11]Conversation with Rear Admiral Maas,USPHS and James W Bawden, University of North Carolina. 11 JUL 2000.

[12]Caries diagnosis and risk assessment: A review of preventive strategies and management. J Am Dent Assoc 1995; 126 (Special Supplement): 1s-24s.

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